



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/550,107	09/21/2005	Evaggelia-Aggeliki Karabassi	2055 0034US	5934
29894 7590 12/15/2008 DREISS, FUHLENDORF, STEIMLE & BECKER POSTFACH 10 37 62 D-70032 STUTTGART, GERMANY				
EXAMINER NGUYEN, SANG H				
ART UNIT		PAPER NUMBER		
2886				
MAIL DATE		DELIVERY MODE		
12/15/2008		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/550,107

Applicant(s)

KARABASSI ET AL.

Examiner

Sang Nguyen

Art Unit

2886

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 October 2008.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 12-18 and 20-24 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 12-18 and 20-24 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/S5108)
Paper No(s)/Mail Date 09/21/05
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____

DETAILED ACTION***Election/Restrictions***

Applicant's election of Group I (claims 12-18, 20-22, and added new claims 23-24) in the reply filed on 10/23/08 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Information Disclosure Statement

The information disclosure statement (IDS) submitted on 09/21/05 has been entered. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the **"an industrial robot"** in claim 18 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate

Art Unit: 2886

figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Response to Amendment

Applicant's response to amendment filed on 10/23/08 has been entered. It is noted that the application contains claims 12-18 and 20-24 and claims 1-11 and 19 have been canceled by the amendment with election on 10/23/2008.

Claim Objections

Claim 24 is objected to because of the following informalities:

Claim 24 line 1; the number "24" should be changed to --23--. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 12-18 and 20-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deichmann et al(WO 02/16865 submitted by Applicant) in view of Proesmans et al (U.S. Patent No. 6,510,244).

Regarding claims 12 and 23-24; Deichmann et al discloses a device and method for calibrating a camera-laser-unit with respect to at least one calibration-object disposed at a given position and orientation in three-dimensional space, the device and method comprising the steps of:

means for selecting a calibration-object (page.12 lines 10-15 and page 46 line 26 to col.48 line 33);

means for disposing the calibration-object (601 of figure 6 or 2101 of figure 21 and page 12 lines 10-29) at a given position and orientation in three-dimensional space (601 of figure 6 or 2101 of figures 21-22 and page 14 lines 3-13) with respect to the camera-laser-unit (a laser [302 of figure 3 or 604 of figure 6] and cameras [301 of figure 3 or 605 of figure 6]), wherein an orientation of the calibration-object (601 of figure 6 or 2101 of figure 21) is such that light emitted by the laser (302 of figure 3 or 604 of figure 6) is visible to the camera (301 of

Art Unit: 2886

figure 3 or 605 of figure 6 and page 24 lines 9-10) on the calibration-object (601 of figure 6 or 2101 of figure 21);

means for calibrating the camera with respect to the calibration-object using a Tsai algorithm (page 15 lines 12-20; page 42 line 27; page 43 line 27 to page 44 line 9);

means for activating the laser (col.24 lines 6-29 and page 52 line 9 to page 54 line 15) to emit light visible on the calibration-object (601 of figure 6 or 2101 of figure 21 and page 12 lines 10-29); and

means for determining and calibrating the laser-properties from the light recorded by the camera (page 53 line 16 to page 56 line 6). See figures 1-28.

Deichmann et al discloses all of features of claimed invention except for the calibrating object having at least two planes disposed at a given angle (β) with respect to each other, each plane having a given, non-coplanar calibration-pattern and means for recording the light on the two planes with the camera. However, Proesmans et al teaches that it is known in the art to provide the calibrating object (figures 1 and 11) having at least two planes disposed at a given angle (col.2 lines 49-55 and col.9 lines 53-57; and figures 1, 11, and 15) with respect to each other, each plane having a given, non-coplanar calibration-pattern (col.1 lines 52-67) and means for (i.e, camera [col.54-55 and figure 1]) recording the light on the two planes (figure 15). See figures 1-17.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to, combine method and device of Deichmann et al with the calibrating object having at least two planes disposed at

Art Unit: 2886

a given angle (β) with respect to each other, each plane having a given, non-coplanar calibration-pattern and means for recording the light on the two planes with the camera as taught by Proesman et al for the purpose of measuring and calibrating accurately with high resolution of the pattern of the three dimensional reconstruction.

It is noted that the recitation "the camera-laser-unit having at least one laser and at least one camera, wherein the laser and the camera are disposed at a given distance with respect to one another, and an optical axis of the laser and an optical axis of the camera subtend a given angle (α), the camera-laser-unit being adapted to record a location, shape and/or dimensions of a measurement-object" has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

Regarding claim 13: Deichmann et al discloses step g) comprises the step of defining a relative position and orientation of the laser (302 of figure 3 or 402, 402' of figure 4) with respect to a coordinate frame (figures 3-5) associated with the calibration-object (601 of figure 6 or 2101 of figures 21-22 and page 14 lines 3-13, wherein the coordinate frame (figures 3-5) has a given position and

Art Unit: 2886

orientation in three-dimensional space (601 of figure 6 or 2101 of figures 21-22 and page 14 lines 3-13).

Regarding claim 14; Deichmann et al discloses all of features of claimed invention except for light emitted by the laser is visible on the two planes of the calibration-object as a line on each plane, the lines intersecting at a contact line of the two planes, wherein the laser-properties are determined from the lines recorded by the camera using a line detection algorithm. However, Proesmans et al teaches that it is known in the art to provide light emitted by the laser (figure 1) is visible on the two planes of the calibration-object (figures 1 and 15 and col.2 lines 53-55) as a line on each plane (figures 11-15), the lines intersecting at a contact line of the two planes (figure 15 col. 2 lines 53-55), wherein the laser-properties are determined from the lines recorded by the camera using a line detection algorithm (col.1 lines 50-67). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine method and device of Deichmann et al with light emitted by the laser is visible on the two planes of the calibration-object as a line on each plane, the lines intersecting at a contact line of the two planes, wherein the laser-properties are determined from the lines recorded by the camera using a line detection algorithm as taught by Proesman et al for the purpose of measuring and calibrating accurately with high resolution of the pattern of the three dimensional reconstruction.

Regarding claim 15; Deichmann et al discloses a laser-plane is defined by an optical axis of the laser (figures 3-7) and the lines visible on the calibration-object (2101 of figure 21), wherein, a position and orientation of the laser-plane

Art Unit: 2886

with respect to a coordinate frame associated with the calibration-object is defined to calibrate the laser according to determined laser-properties (ol.24 lines 6-29 and page 52 line 9 to page 56 line 6). Deichmann et al discloses all of features of claimed invention except for the lines visible on the two planes of the calibration-object. However, Proesmans et al teaches that it is known in the art to provide the lines visible on the two planes of the calibration-object (figures 11-15). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine method and device of Deichmann et al with the lines visible on the two planes of the calibration-object as taught by Proesman et al for the purpose of measuring and calibrating accurately with high resolution of the pattern of the three dimensional reconstruction.

Regarding claim 16; Deichmann et al discloses step c) comprises the step of defining a relative position and orientation of the camera with respect to a coordinate frame associated with the calibration-object, said coordinate frame having a given position and orientation in three-dimensional space. See figures 3-5.

Regarding claim 17; Deichmann et al discloses further comprising defining a transformation matrix in dependence on a relative position and orientation of the camera with respect to a coordinate frame associated with the calibration-object, a relative position and orientation of the laser with respect to the coordinate frame, and/or on internal camera parameters (page lines 16-20 and page 38 line 30 to page 50 line 10).

Regarding claim 18; Deichmann et al discloses further comprising grasping the camera-laser-unit (i.e., scanner unit having a laser [302 of figure 3] and camera [301 of figure 3 and see abstract]) with an industrial robot (figures 1-5) and disposing the unit relative to the calibration-object (201 of figure 2) in a given position and orientation in three-dimensional space (figures 2 and 21), wherein an orientation of the camera-laser-unit is such that light emitted by the laser (302 of figure 3) is visible to the camera (301 of figure 3) on the at least two planes of the calibration-object (201 of figure 2).

Regarding claims 20-22; Deichmann et al discloses all of features of claimed invention except for said angle between said two planes of the calibration-object is a right angle, wherein features of said calibration-pattern are designed as recesses or as cavities having a circular cross section and features of said calibration-pattern comprise prints on said two planes. However, Proesmans et al teaches that it is known in the art to provide said angle between said two planes of the calibration-object is a right angle (col.2 lines 53-55), wherein features of said calibration-pattern are designed as recesses or as cavities having a circular cross section (figures 3a-7), and features of said calibration-pattern comprise prints on said two planes (figures 14-17). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine method and device of Deichmann et al with said angle between said two planes of the calibration-object is a right angle, wherein features of said calibration-pattern are designed as recesses or as cavities having a circular cross section and features of said calibration-pattern comprise

Art Unit: 2886

prints on said two planes as taught by Proesman et al for the purpose of measuring and calibrating accurately with high resolution of the pattern of the three dimensional reconstruction.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Williamson (2002/0158873); Habibi et al (6816755); Hara et al (6728417); Callari et al (6415051); De Smet (6321137); Davis (6101455); Weng et al (6081273) ; Yamamoto et al (5748865); Bani-Hashemi (5475584) ; or McGee et al (4942539).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sang Nguyen whose telephone number is (571) 272-2425. The examiner can normally be reached on 9:30 am to 7:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tarifur Chowdhury can be reached on (571) 272-2800 ext. 86. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-

Art Unit: 2886

free). If you would like assistance from a USPTO Customer Service

Representative or access to the automated information system, call 800-786-

9199 (IN USA OR CANADA) or 571-272-1000.

December 10, 2008

/Sang Nguyen/

Primary Examiner, Art Unit 2886